

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : **10-166705**  
 (43)Date of publication of application : **23.06.1998**

(51)Int.CI. **B41L 13/04**  
**B41M 1/14**

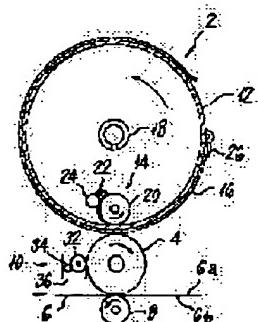
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## (54) STENCIL PRINTER

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To prevent bleeding and setoff by forming at least the surface of an intermediate transfer body of a material having a solvent permeating property, and providing a cleaning means to clean the surface of the intermediate transfer body after transfer without using a cleaning liquid.

**SOLUTION:** The stencil printer is provided with a cylinder 2, an intermediate transfer body 4 pressed against the cylinder 2, a transfer-compression roller 8 as a pressing means that presses paper 6 against the transfer body 4, and a cleaning device 10 that cleans the surface of the transfer body 4 after transfer. The intermediate transfer body 4 is formed of a silicone rubber layer as a material having a solvent permeating property in the surface and makes possible to transfer an ink image to the paper 6 in a state of having less oily components. The cleaning device 10 is composed of a cleaning roller 32, a squeezing roller 34 that contacts the roller, and a casing 36 that stores removed ink, and ink is removed with a brush roller as a cleaning roller 32.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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10-166705

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CLAIMS

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[Claim(s)]

[Claim 1] The mimeograph printing machine characterized by having a cleaning means to clean the front face after the imprint of the above-mentioned middle imprint object, without using cleaning liquid while being formed with the material characterized by providing the following. The printing version drum which forms an ink picture. The middle imprint object which a pressure welding is carried out [ object ] to this printing version drum, and has the above-mentioned ink picture imprinted. Once equipping this middle imprint object with a press means to press a form and imprinting the above-mentioned ink picture on the above-mentioned middle imprint object, even if there are few above-mentioned middle imprint objects in the mimeograph printing machine imprinted in the above-mentioned form, a front face is a solvent osmosis property.

[Claim 2] The mimeograph printing machine according to claim 1 which 2 pressure weldings of the double-sided simultaneous printing of the above-mentioned printing version drum are made possible to the front face of the above-mentioned middle imprint object, and is characterized by one printing version drum serving as the function of the above-mentioned press means.

[Claim 3] The mimeograph printing machine according to claim 2 characterized by preparing the printing version drum of the direction which does not serve as the function of the above-mentioned press means among the above-mentioned printing version drums free [ attachment and detachment ] to the above-mentioned middle imprint object.

[Claim 4] The mimeograph printing machine according to claim 1 characterized by making possible the pressure welding of the process printing of two or more above-mentioned printing version drums to the circumference of a front face of the above-mentioned middle imprint object.

[Claim 5] While the parallel arrangement of two or more printing version drums which form an ink picture is carried out corresponding to each color of process printing. The pressure welding of the middle imprint object which has the above-mentioned ink picture imprinted is individually carried out to all of these printing version drums, or the printing version drum after the 2nd edition. And while having a press means for pressing a form on the above-mentioned printing version drum or the above-mentioned middle imprint object, and imprinting the above-mentioned ink picture in this form and forming the front face at least with the material of the above-mentioned middle imprint object which has a solvent osmosis property. The mimeograph printing machine characterized by having a cleaning means to clean the front face after the imprint of the above-mentioned middle imprint object, without using cleaning liquid.

[Claim 6] The mimeograph printing machine according to claim 1, 2, 3, or 5 characterized by carrying out the pressure welding of the member which has a solvent osmosis property on the front face of the above-mentioned middle imprint object before the imprint process to the above-mentioned form.

[Claim 7] the mimeograph printing machine according to claim 4 characterized by carrying out the pressure welding of the member which has a solvent osmosis property on the front face of the above-mentioned middle imprint object in the downstream of the printing version drum of each above

[Claim 8] The claim 1 characterized by the above-mentioned press means having the heat source, 4, or a mimeograph printing machine given in five.

[Claim 9] The claim 1 characterized by making it transfer to the rear face of the above-mentioned form, and discharging once transferring the oil system component of the ink accumulated inside the above-mentioned middle imprint object to the above-mentioned press means, 4, or a mimeograph printing machine given in five.

[Claim 10] The claim 1 characterized by holding the above-mentioned press means in the position which carried out the pressure welding to the above-mentioned middle imprint object, 4, or a mimeograph printing machine given in five.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention forms an ink picture on the printing version drum on which the periphery side was equipped with mimeograph stencil paper, and relates to the mimeograph printing machine which carries out the indirect imprint of this ink picture through a middle imprint object at a form.

[0002]

[Description of the Prior Art] As shown in drawing 10, outline composition of this kind of mimeograph printing machine is carried out from the printing version drum 70 on which the periphery side was equipped with mimeograph stencil paper, the imprint pressurization roller 72 as a press means, and the ink supply means 74 prepared in the interior of the printing version drum 70. The ink supply means 74 is equipped with the inking roller 76 which touches the inner skin of the printing version drum 70, and Dr. Lola 78 who regulates the amount of ink to this inking roller 76, and ink is supplied through the version body-rotation shaft 80 of the printing version drum 70. If the form which passes the form conveyance path 82 is pressed by the periphery side of the printing version drum 70 with the imprint pressurization roller 72, the ink sent out by the inking roller 76 will be transferred on the surface of a form, and an ink picture will be formed of this. As ink, the emulsion type ink which generally forms the emulsion of a drainage system component and an oil system component is used. Composition distribution is made so that it may not solidify in process in which the printing version drum 70 and mimeograph stencil paper are passed, and this has the property that stability is high.

[0003] However, usually, dozens of microns and since it is thick, the thickness of the ink which this solidification transferred to the form in addition to the late ink property has the long drying time, and has various problems by this. Namely, although a dryness process starts by volatilization of a drainage system component when a form imprints, since an oil system component remains on a form as it is, a bleeding picture and a strike-through phenomenon (ink should permeate to the background of a form) tend to generate it with not much sufficient picture fixing nature. Moreover, since the drying time per sheet was very short when conveying a form continuously and performing high-speed abundant printing, when laminating delivery was carried out at a delivery tray, the so-called set-off phenomenon which the picture of a certain form transfers to the rear face of a form just above arose, and the debasement of printed matter had been caused.

[0004] Moreover, as shown in drawing 11, when it is the mimeograph printing machine dealing with process printing with which two or more parallel arrangements of the above-mentioned printing composition were carried out, When imprinting the ink picture of two amorous glance in the printing section B in the form which imprinted the ink picture of one amorous glance in the printing section A, the so-called offset phenomenon from which the ink of one amorous glance adheres to the mimeograph stencil paper of two amorous glance through a form, and the adhesion ink adheres to the following form again, and serves as a greasing and a double picture was produced.

[0005] Although carrying out quick drying of the ink picture transferred to the form by heat or hot blast compulsorily as a method of coping with the problem resulting from the low drying property of such an ink picture etc. is considered variously, the thing of the indirect printing method (offset-printing method) indicated by JP,5-318898,A, for example is known from a viewpoint of a manufacturing cost or picture quality. This imprints in a form the ink picture which once imprinted the ink picture formed on the printing version drum on the middle imprint object, and was imprinted by this middle imprint object with the welding pressure by the press means. The elastic sheet of oil resistance is stuck on the front face of a middle imprint object, and cleaning equipment removes the ink which remained on the elastic sheet after printing. Cleaning serves as a chemical-cleaning method which supplies cleaning liquid to a cleaning roller. According to this method, the ink picture transferred to the middle imprint object can fully be stuffed into a form, and can be made to be able to permeate it in addition to the ability to obtain the dryness promotion operation by the imprint process to a middle imprint object itself, climax (thickness) of an ink picture can be lessened, and dryness can be sped up.

[0006] As what is depended on the same indirect printing method as this, the printer of a publication is in JP,8-142302,A. In order to improve more imprint nature of the ink from a middle imprint object to a form in the case of this equipment, and in order to make easy to remove the ink which remains on a middle imprint object after an imprint, the front face at least is formed flat and smooth with the material of a middle imprint object which shows \*\* ink nature. Moreover, in order to remove remains ink, it has an ink removal liquid supply means to supply ink removal liquid to the front face of a middle imprint object. Ethylene tetrafluoride (PTFE), silicone rubber, etc. are illustrated as a material which shows \*\* ink nature.

[0007]

[Problem(s) to be Solved by the Invention] However, since it is the composition that all remove the ink which remained on the front face (it is the same an elastic sheet front face and the following in JP,5-318898,A) of a middle imprint object using cleaning liquid in the case of the above-mentioned conventional indirect printing method, the thin film of minute amount cleaning liquid was formed in the middle imprint body surface, and the new problem that bleed by this and a picture occurs has arisen. Moreover, in addition to the problem on such picture quality, since the mechanism of supply of cleaning liquid, a recovery means, a tank, etc. becomes indispensable, cleaning equipment's being complicated and the constitutional problem of enlarging have also been produced.

[0008] this invention sets offer of a mimeograph printing machine which can avoid complicated and enlargement of cleaning equipment as the main purpose while it can solve the problem on the quality of printed matter, such as a bleeding picture, and an offset phenomenon, a set-off.

[0009]

[Means for Solving the Problem] With the technology indicated by JP,5-318898,A and JP,8-142302,A, it responds to the ink picture formed on the printing version drum as it is with a middle imprint object, and is based on the idea of imprinting this in a form in the state as it is. In the case of JP,8-142302,A, this is clear from the point which forms a front face at least with the material of a middle imprint object which shows \*\* ink nature, and mentions ethylene tetrafluoride (PTFE) to first in a roll as the material. That is, ethylene tetrafluoride (PTFE) is well known as a functional material excellently equipped with hydrofuge and both oil-repellent properties, and when the front face of a middle imprint object is formed with this material, an oil system component will also be held on the front face of a middle imprint object as it is not to mention the drainage system component of the ink picture imprinted from the printing version drum. If it puts in another way, the cleaning equipment with which the remains ink which remains in the front face of a middle imprint object after an imprint also uses cleaning liquid since the oil system component is held as it is needed. In addition, as a material which shows \*\* ink nature, although silicone rubber is otherwise illustrated, this is also adopted from same viewpoint. Moreover, in the case of JP,5-318898,A, since there is the publication "the elastic sheet of oil resistance", it is clear to be based on the same idea as JP,8-142302,A.

[0010] As stated above, the oil system component of the ink picture imprinted by the form is held, and the fundamental cause of the problems, such as a set-off, has time in dryness of the ink picture imprinted by this at this thing. While the drainage system component of an ink picture can acquire quick-drying [ of an ink picture ] simultaneously with the imprint to a form if an oil system component is absorbed with a middle imprint object since it is absorbed by volatilization or the form at the time of the imprint to a form from a middle imprint object and volatilizes without it remains in the state of the powder which made the pigment of ink the subject also for the ink (non-imprinted ink) which remained on the front face of a middle imprint object since there were few oil system components and uses cleaning liquid for this reason -- being mere -- mechanical -- it will scratch and can remove in a mode This is the meaning of this invention. The printing version drum which specifically forms an ink picture by invention according to claim 1, In the mimeograph printing machine imprinted in the above-mentioned form once equipping the middle imprint object which a pressure welding is carried out [ object ] to this printing version drum, and has the above-mentioned ink picture imprinted, and this middle imprint object with a press means to press a form and imprinting the above-mentioned ink picture on the above-mentioned middle imprint object While the front face is formed at least with the material of the above-mentioned middle imprint object which has a solvent osmosis property, the composition of having a cleaning means to clean the front face after the imprint of the above-mentioned middle imprint object, without using cleaning liquid is taken.

[0011] In invention according to claim 2, in composition according to claim 1, 2 pressure weldings of the double-sided simultaneous printing of the above-mentioned printing version drum were made possible to the front face of the above-mentioned middle imprint object, and the composition that one printing version drum serves as the function of the above-mentioned press means is taken. In invention according to claim 3, the composition that the printing version drum of the direction which does not serve as the function of the above-mentioned press means among the above-mentioned printing version drums is prepared free attachment and detachment ] to the above-mentioned middle imprint object is taken in composition according to claim 2. In invention according to claim 4, the composition that the pressure welding of the process printing of two or more above-mentioned printing version drums is made possible to the circumference of a front face of the above-mentioned middle imprint object is taken in composition according to claim 1.

[0012] While the parallel arrangement of two or more printing version drums which form an ink picture is carried out in invention according to claim 5 corresponding to each color of process printing The pressure welding of the middle imprint object which has the above-mentioned ink picture imprinted is individually carried out to all of these printing version drums, or the printing version drum after the 2nd edition. And it has a press means for pressing a form on the above-mentioned printing version drum or the above-mentioned middle imprint object, and imprinting the above-mentioned ink picture in this form. The composition that the front face is formed with the material of the above-mentioned middle imprint object which has a solvent osmosis property, and equips the imprint position downstream to the above-mentioned form with a cleaning means to clean the front face of the above-mentioned middle imprint object, without using cleaning liquid is taken at least.

[0013] In invention according to claim 6, the composition of carrying out the pressure welding of the member which has a solvent osmosis property on the front face of the above-mentioned middle imprint object before the imprint process to the above-mentioned form is taken in composition according to claim 1, 2, 3, or 5. in invention according to claim 7, the composition of carrying out the pressure welding of the member which has a solvent osmosis property on the front face of the

above-mentioned middle imprint object in the downstream of the printing version drum of each above is taken in composition according to claim 4 In invention according to claim 8, the composition that the above-mentioned press means has the heat source is taken in composition a claim 1, 4, or given in five. In invention according to claim 9, in composition a claim 1, 4, or given in five, once transferring the oil system component of the ink accumulated inside the above-mentioned middle imprint object to the above-mentioned press means, the composition of making it transferring to the rear face of the above-mentioned form, and discharging is taken. In invention according to claim 10, the composition of holding in the position which carried out the pressure welding of the above-mentioned press means to the above-mentioned middle imprint object is taken in composition a claim 1, 4, or given in five.

[0014]

[Example] Hereafter, one example of this invention is explained based on drawing 1 and drawing 2. The mimeograph printing machine is equipped with the printing version drum 2, the middle imprint object 4 by which the pressure welding was carried out to the periphery side of this printing version drum 2, the imprint pressurization roller 8 as a press means to press a form 6 on this middle imprint object 4, and the cleaning equipment 10 which cleans the front face after the imprint of the middle imprint object 4 over a form 6 as shown in drawing 1. The imprint pressurization roller 8 is formed so that a pressure welding may be carried out to the middle imprint object 4 and the state may be held (claim 10).

[0015] Outline composition of the printing version drum 2 is carried out from the screen drum 12 of porous structure the ink supply means 14 with which the interior of this screen drum 12 was equipped, and the mimeograph stencil paper 16 with which twist around the periphery side of the screen drum 12, and it is equipped in the state. The ink supply means 14 consists of Dr. Lola 24 who regulates the amount of ink from ink\*\*\*\*\* 22 formed between the ink delivery pipe 18 as the axis of rotation of the screen drum 12, the inking roller 20 which supplies emulsion type ink to the inner skin of the screen drum 12, and this inking roller 20. After the mimeograph stencil paper 16 has a picture formed by the melting punching method at a thermal head based on the image information of a manuscript by the plate feeder which is not illustrated, it is cut from a roll state by predetermined length, has the nose of cam pinched by the clamer 26 with which the periphery side of the screen drum 12 was equipped, and the screen drum 12 is equipped with it. The mimeograph stencil paper 16 after the completion of printing is processed based on the predetermined \*\* version process.

[0016] The ink supplied from the ink supply means 14 passes through the screen drum 12 in the direction of a path, and oozes out by the contact pressure of the middle imprint object 4 from the punch station of the mimeograph stencil paper 16, and an ink picture is imprinted by this on the front face of the middle imprint object 4. The ink picture imprinted by the middle imprint object 4 is imprinted by press operation of the imprint pressurization roller 8 at surface 6a of a form 6.

[0017] The middle imprint object 4 is formed in the silicone rubber layer 28 as a material into which the front face has a solvent osmosis property, as shown in drawing 2 (claim 1). Although silicone rubber is excellent in water repellence, it is known that it is inferior to ethylene tetrafluoride (PTFE) etc. in oil repellency. Paying attention to the property fall in the oil repellency of this silicone rubber, this is used as a solvent osmosis property. If a part of ink picture is explained typically, both a drainage system component and an oil system component exist in a front face, and the ink picture 30 immediately after imprinting from the printing version drum 2 is in the big climax state, as shown in the 1st process of drawing 2. If time passes, as shown in the 2nd process, a certain amount of oil system component 30a of the ink picture 30 will be incorporated in the silicone rubber layer 28 with the solvent osmosis property of the silicone rubber layer 28, and drainage system component 30b etc. will remain in a front face by the few oil system component and water repellence. Since the imprint to a form 6 is made in this state, the ink picture 30 is imprinted by the front face of a form 6 in the state with few oil system components. Drainage system component 30b is absorbed by volatilization or the form 6, and decreases rapidly. For this reason, as shown in the 3rd process, both the ink that is not imprinted [ which remains on the front face of the middle imprint object 4 after an imprint ] will be in the powder state with few oil system components and drainage system components which made the pigment the subject.

[0018] The cleaning equipment 10 for removing this residual ink consists of a cleaning roller 32, a squeezing roller 34 in contact with this cleaning roller 32, and casing 36 that holds the removed ink. The brush roller is used for a cleaning roller 32. As mentioned above, residual ink is in a powder state, and since there are very few oil system components, the brush roller as a mechanical removal means is enough, and chemical washing with cleaning liquid is unnecessary. The ink scratched by the cleaning roller 32 is scratched by the squeezing roller 34, and is collected in casing 36.

[0019] With the pressure welding before a form 6 is sent between the middle imprint object 4 and the imprint pressurization roller 8, the oil system component accumulated in the silicone rubber layer 28 is transferred to the imprint pressurization roller 8, and is further transferred to rear-face 6b of a form 6 from the imprint pressurization roller 8 at the time of the imprint to a form 6 (claim 9). For this reason, even if it forms only the surface-layer portion of the middle imprint object 4 with the material which has a solvent osmosis property, the saturation state by accumulation of an oil system component cannot happen, but can always demonstrate a solvent osmosis property. Moreover, by using emulsion type ink, the ink of amount sufficient also on the front face of the silicone rubber layer 28 can be carried, namely, the ink of sufficient amount to obtain proper picture concentration can be carried, and it becomes easy [ cleaning ] as mentioned above by absorbing the oil system component.

[0020] Thus, if a front face is formed at least with the material of the middle imprint object 4 which has a solvent osmosis property, since the oil system component of the ink picture which is imprinted by the middle imprint object 4 from the printing version drum 2, and remains on the front face of the middle imprint object 4 can be lessened, the rate of drying of the ink picture imprinted to the form 6 can be sped up sharply, and a bleeding picture, a strike-through, and a set-off can be prevented. Therefore, high quality and high-speed printing become possible. In addition, although only the surface layer of the middle

imprint object 4 was formed in the above-mentioned example with the material which has a solvent osmosis property, you may form the whole with this material. Moreover, it is suitably employable if it has not only silicone rubber but water repellence as a material which has a solvent osmosis property. Moreover, since an attachment-and-detachment mechanism becomes unnecessary while the imprint pressurization roller 8 can prevent the noise by colliding to the middle imprint object 4, since it is the composition which always carries out the pressure welding of the imprint pressurization roller 8 to the middle imprint object 4, a cost cut can be aimed at, and improvement in the endurance of the imprint pressurization roller 8 and the middle imprint object 4 can be planned further. Of course, even if it forms the imprint pressurization roller 8 in the middle imprint object 4 free attachment and detachment ] according to an attachment-and-detachment mechanism, there is no change in the function based on the above-mentioned solvent osmosis property being obtained.

[0021] Drawing 3 and drawing 4 show the example corresponding to claims 2 and 3. In addition to the key objective "offer of a mimeograph printing machine which can avoid complicated and enlargement of a cleaning means while the problem on the quality of printed matter, such as a bleeding picture, and an offset phenomenon, a set-off, is solvable", this example aims at evasion of useless use of the mimeograph stencil paper in the case of printing only one side in the mimeograph printing machine of a double-sided simultaneous printing method. In addition, what has the same above-mentioned example and a the same sign is simplified and shown (it is the same hereafter). Moreover, the explanation about the composition and a function is omitted, as long as there is no need, especially since it is the same as that of the above-mentioned example (it is the same hereafter). As shown in drawing 3, outline composition of the mimeograph printing machine dealing with double-sided simultaneous printing in this example is carried out from the middle imprint object 4, the printing version drum 40 of the bottom by which a pressure welding is carried out in the upper and lower sides of this middle imprint object 4, respectively, the lower printing version drum 42, and the cleaning means 10 (claim 2). The supply direction of the ink in the lower printing version drum 42 is the direction of Arrow N. For convenience, if the ink color of red and the lower printing version drum 42 is made blue for the ink color of the upper printing version drum 40, middle printing through the middle imprint object 4 will be only a blue ink picture imprinted by rear-face 6b of a form 6, and the ink picture of the red imprinted by surface 6a of a form 6 will be directly imprinted from the printing version drum 40 like an old method. Therefore, in this case, in the imprint of a blue ink picture, the printing version drum 40 will function as an imprint pressurization roller 8 in the above-mentioned example, and the middle imprint object 4 will present the same function in the imprint of a red ink picture. As the above-mentioned example explained the non-imprinted ink after an imprint, it is scratched with the cleaning means 10 and the front face of the middle imprint object 4 is maintained on an always new front face.

[0022] Moreover, the lower printing version drum 42 is formed free [ attachment and detachment ] to the middle imprint object 4 by the driving means which are not illustrated (claim 3). When performing one side printing, as shown in drawing 4, the lower printing version drum 42 is separated from the middle imprint object 4. The direct imprint method which uses the middle imprint object 4 as an imprint pressurization roller by this can perform one side printing. In the former, although the front face of the printing version drum which is not used purposely needed to be equipped with non-engraved mimeograph stencil paper so that a form rear face might not become dirty in the ink of the printing version drum which is not used when the mimeograph printing machine dealing with double-sided simultaneous printing performed one side printing, since the worries about ink dirt disappear, useless consumption of mimeograph stencil paper is avoidable according to the thing of this example.

[0023] Drawing 5 shows the example corresponding to claims 4 and 7. The mimeograph printing machine in this example has simultaneous multicolor printing machine ability, the pressure welding of the two printing version drums 44 and 46 is carried out to the circumference of the front face of one middle imprint object 4, and the solvent absorption meanses 48 and 50 are formed in the downstream of each printing version drum 44 and 46. A solvent absorption means 48 by which it is located in the downstream of the printing version drum 44 consists of a blotter roller 52 formed by the member which has a solvent osmosis property, a blotter squeezing roller 54 which fails to scratch the ink adhering to the blotter roller 52, and casing 56 which holds the ink which failed to be scratched. Similarly, a solvent absorption means 50 by which it is located in the downstream of the printing version drum 46 consists of a blotter roller 52, a blotter squeezing roller 54, and casing 58. The solvent said here points out the oil system component contained in emulsion type ink, and is a liquid paraffin. From the front face of the middle imprint object 4, since, as for a far portion, the solvent osmosis property of the middle imprint object 4 is not fully careful to the method of outside yet, as for the ink picture imprinted by the middle imprint object 4, an oil system component exists mostly. By absorbing this oil system component before an imprint process, while scratching excessive ink again, a good printing picture without bleeding can be acquired by making common the ink of the mountain configuration formed on the front face of the middle imprint object 4.

Moreover, since the adhesion of ink is improved when an oil system component decreases, improvement in imprint efficiency can be aimed at. The solvent absorption meanses 48 and 50 are established from this viewpoint. In addition, each blotter roller 52 is taken with the middle imprint object 4, and is carried out the surroundings. Moreover, each blotter roller 52 is formed by silicone rubber like the middle imprint object 4.

[0024] When the ink color of red and the printing version drum 46 of the 2nd edition is made blue for the ink color of the printing version drum 44 of the 1st edition, the ink picture formed on the middle imprint object 4 in red ink has excessive ink and an oil system component absorbed by the blotter roller 52 of the solvent absorption means 48 for convenience. By this, the offset phenomenon by which red ink is re-imprinted is prevented by the mimeograph stencil paper of the printing version drum 46 dealing with blue ink in a downstream. Then, although a blue ink picture is formed in the middle imprint object 4, excessive ink and an oil system component are absorbed with the blotter roller 52 of the solvent absorption means 50 before an imprint. Subsequently, the ink picture of two colors is imprinted by press operation of the imprint pressurization roller 8 on a form 6. It is

blotter: stain

failed to scratch [ the cleaning means 10 ] the non-imprinted ink which was not able to be imprinted, and the front face of the middle imprint object 4 becomes new, and the next printing is equipped with it. By considering as such composition, it becomes possible to obtain the printed matter of two colors simultaneously with one middle imprint object 4. Although the example dealing with 2 color simultaneous printing was shown in this example, the printed matter of two or more colors corresponding to the number can be simultaneously obtained by increasing the number of the printing version drums.

[0025] Drawing 6 and drawing 7 show the example corresponding to a claim 5. The mimeograph printing machine in this example carries out the two-piece parallel arrangement of the printing composition section which has the middle imprint object 4 shown in the first example in the conveyance direction of a form 6, and is constituted. According to this example, since an oil system component is absorbed with the solvent absorption property of the imprint object 4, it can fully dry in the process to the 2nd edition, and the red ink of the 1st edition can prevent the offset phenomenon and set-off phenomenon which had produced the blue ink of the 2nd edition with the conventional composition of drawing 11 since the oil system component was similarly absorbed with the solvent absorption property of the imprint object 4. Drawing 7 is the example which formed the middle imprint object 4 only in the printing composition section of the 2nd edition. In the case of this example, although the 1st edition is the direct imprint composition of the conventional method, in case the blue ink of the 2nd edition is put on the form 6 in which the red ink of the 1st edition appeared, the red ink which moved to the middle imprint object 4 is scratched with the cleaning means 10 while it has an oil system component absorbed there. Therefore, since an offset picture will not be generated on a form 6 and the excessive red ink on a form 6 will be scratched with the middle imprint object 4 as a result, generating of a bleeding picture is also suppressed.

[0026] Drawing 8 shows the example corresponding to claims 6 and 8. Although it is an example dealing with process printing by the parallel-arrangement composition shown by drawing 6, before the imprint process from the same viewpoint as the example shown by drawing 5 to a form, the solvent absorption means 58 is established possible [ absorption of the oil system component of the ink picture imprinted by the middle imprint object 4 ] (claim 6). The solvent absorption means 58 consists of the blotter roller 52, a brush roller 60 which scratches the ink adhering to this blotter roller 52, a blotter squeezing roller 54, and casing 62. Moreover, the imprint pressurization roller 64 in this example has the heat source (claim 8), and can heat it now at 100 degrees C. Since the ink on the middle imprint object 4 is heated by this, while the rate of an imprint to a form 6 improves and the burden of the cleaning means 10 is mitigated, a more high-concentration printing picture can be acquired. The optimum value from which the temperature of this imprint pressurization roller 64 was beforehand obtained by experiment etc. according to ink composition will be set up.

[0027] Although a cleaning means 10 to have the brush roller 32 was used in each above-mentioned example, as shown in drawing 9, you may use the cleaning means 66 which lets out the fiber sheet 68 and is moved in the direction of an arrow with a roller 69, the pressurization roller 70, and the rolling-up roller 71. In addition, in each above-mentioned example, on explanation, although having called the oil system component of the composition component of ink has pointed out the liquid paraffin which is a principal component, it is not limited to this and the above-mentioned effect by the solvent osmosis property same about other general solvents, for example, a hydrocarbon system, can be acquired.

[0028]

[Effect of the Invention] Since it considered as the composition which forms a front face at least with the material of a middle imprint object which has a solvent osmosis property according to invention according to claim 1. Since the oil system component of the ink picture which is imprinted by the middle imprint object from the printing version drum, and remains on the front face of a middle imprint object can be lessened, the rate of drying of the ink picture imprinted to the form can be sped up sharply, and a bleeding picture, a strike-through, a set-off, and an offset phenomenon can be prevented. Therefore, high quality and high-speed printing become possible. Moreover, since it is the composition using the cleaning means which does not use cleaning liquid, the mechanism of supply of cleaning liquid, a recovery means, a tank, etc. is not needed, but, therefore, complication of a cleaning means and enlargement can be avoided. Moreover, the bleeding picture by the thin film of the cleaning liquid which remained in order not to use cleaning liquid is avoidable.

[0029] Since it considered as the composition which makes possible the pressure welding of the double-sided simultaneous printing of the two printing version drums to the front face of the above-mentioned middle imprint object according to invention according to claim 2, in addition to the above-mentioned basic effect, a quality simultaneous double-sided printing picture without generating of a set-off phenomenon can be acquired, and a quality simultaneous double-sided printing picture with little bleeding can be acquired. Since one printing version drum was considered as the composition which can attach and detach freely to the middle imprint object in double-sided simultaneous printing composition according to invention according to claim 3, it can add to the above-mentioned basic effect, and useless consumption of the mimeograph stencil paper in one side printing can be avoided. Since it considered as the process-printing composition which has arranged two or more printing version drums around one middle imprint object according to invention according to claim 4, in addition to the above-mentioned basic effect, miniaturization of process-printing composition can be attained. Since it considered as the composition which carries out the parallel arrangement of two or more printing version drums, and carries out the pressure welding of the above-mentioned middle imprint object to the printing version drum after the 2nd [ at least ] edition according to invention according to claim 5, in addition to the above-mentioned basic effect, an offset picture and a quality process-printing picture without generating of a set-off phenomenon can be acquired.

[0030] reduction of as opposed to [ since it considered as the composition which absorbs a solvent before the imprint to a form according to invention of a claim 6 and seven publications, while being able to aim at improvement in the rate of an imprint ]

cleaning of a load -- cleaning -- reinforcement of a member can be attained Moreover, the prevention precision of the bleeding picture in the basic effect can be raised further. reduction of as opposed to [ since the press means considered as the composition which has a heat source according to invention according to claim 8, while being able to aim at improvement in the rate of an imprint in addition to the above-mentioned basic effect ] cleaning of a load -- cleaning -- reinforcement of a member can be attained Since it considered as the composition which discharges the oil system component accumulated on a middle imprint object via a press means according to composition according to claim 9, in addition to the above-mentioned basic effect, the solvent absorption function by the solvent osmosis property of a middle imprint object can always be demonstrated on this level. Since an attachment-and-detachment mechanism becomes unnecessary while being able to prevent the noise by a press means colliding with a middle imprint object, since it considered as the composition which holds a press means in the state where the pressure welding was carried out to the middle imprint object according to composition according to claim 10, a cost cut can be aimed at, and the endurance of a press means and a middle imprint object can be raised by composition which does not collide further.

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[Translation done.]

(19)日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11)特許出願公開番号

特開平10-166705

(43)公開日 平成10年(1998)6月23日

(51)Int.Cl.  
B 41 L 13/04  
B 41 M 1/14

識別記号

F I  
B 41 L 13/04  
B 41 M 1/14

B

審査請求 未請求 請求項の数10 O.L (全 8 頁)

(21)出願番号 特願平8-330972

(22)出願日 平成8年(1996)12月11日

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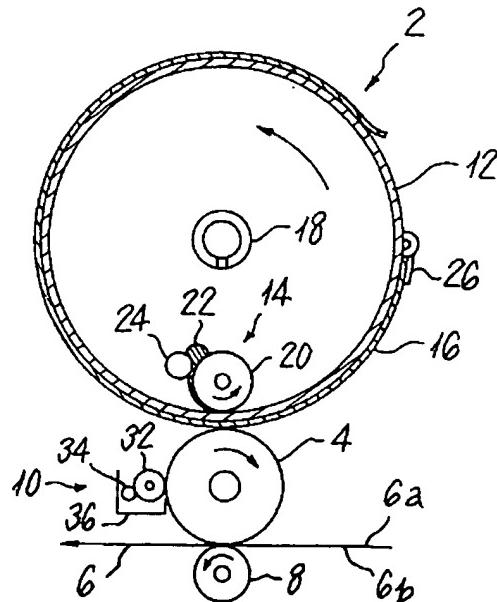
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(54)【発明の名称】 孔版印刷機

(57)【要約】

【課題】 にじみ画像やオフセット現象、裏移り等の印刷物の品質上の問題を解消することができるとともに、中間転写体の表面をクリーニングするクリーニング手段の複雑化、大型化を回避できる孔版印刷機の提供。

【解決手段】 中間転写体4の少なくとも表面を溶剤浸透特性を有する材料としてのシリコンゴム層28で形成し、クリーニング液を使用しないクリーニング手段10を設ける。



## 【特許請求の範囲】

【請求項1】インキ画像を形成する印刷版胴と、該印刷版胴に圧接され上記インキ画像を転写される中間転写体と、該中間転写体に用紙を押す押圧手段とを備え、上記インキ画像を上記中間転写体に一旦転写した後に上記用紙に転写する孔版印刷機において、

上記中間転写体の少なくとも表面が溶剤浸透特性を有する材料で形成されているとともに、上記中間転写体の転写後の表面をクリーニング液を使用せずにクリーニングするクリーニング手段を備えていることを特徴とする孔版印刷機。

【請求項2】上記中間転写体の表面に、上記印刷版胴が両面同時印刷可能に2つ圧接され、一方の印刷版胴が上記押圧手段の機能を兼ねることを特徴とする請求項1記載の孔版印刷機。

【請求項3】上記印刷版胴のうち、上記押圧手段の機能を兼ねない方の印刷版胴が上記中間転写体に対して接離自在に設けられていることを特徴とする請求項2記載の孔版印刷機。

【請求項4】上記中間転写体の表面周囲に、上記印刷版胴が多色印刷可能に複数個圧接されていることを特徴とする請求項1記載の孔版印刷機。

【請求項5】インキ画像を形成する印刷版胴が多色印刷の各色に対応して複数個並列配置されているとともに、上記インキ画像を転写される中間転写体がこれらの印刷版胴の全部もしくは2版目以降の印刷版胴に個別に圧接され、且つ、上記印刷版胴もしくは上記中間転写体に用紙を押すして該用紙に上記インキ画像を転写するための押圧手段を備え、上記中間転写体の少なくとも表面は溶剤浸透特性を有する材料で形成されているとともに、上記中間転写体の転写後の表面をクリーニング液を使用せずにクリーニングするクリーニング手段を備えていることを特徴とする孔版印刷機。

【請求項6】上記用紙への転写工程前に、上記中間転写体の表面に溶剤浸透特性を有する部材を圧接することを特徴とする請求項1又は2又は3又は5記載の孔版印刷機。

【請求項7】上記各々の印刷版胴の下流側における上記中間転写体の表面に、溶剤浸透特性を有する部材を圧接することを特徴とする請求項4記載の孔版印刷機。

【請求項8】上記押圧手段が熱源を有していることを特徴とする請求項1又は4又は5記載の孔版印刷機。

【請求項9】上記中間転写体の内部に蓄積するインキの油系成分を上記押圧手段に一旦転移させた後、上記用紙の裏面に転移させて排出することを特徴とする請求項1又は4又は5記載の孔版印刷機。

【請求項10】上記押圧手段を、上記中間転写体に圧接した位置に保持したことを特徴とする請求項1又は4又は5記載の孔版印刷機。

【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、外周面に孔版原紙が装着された印刷版胴でインキ画像を形成し、このインキ画像を中間転写体を介して用紙に間接転写する孔版印刷機に関する。

## 【0002】

【従来の技術】この種の孔版印刷機は、図10に示すように、外周面に孔版原紙が装着された印刷版胴70と、押圧手段としての転写加压ローラ72と、印刷版胴70の内部に設けられたインキ供給手段74から概略構成されている。インキ供給手段74は、印刷版胴70の内周面に接するインキローラ76と、このインキローラ76へのインキ量を規制するドクターローラ78を備えており、インキは印刷版胴70の版胴回転軸80を介して供給されるようになっている。用紙搬送経路82を通過する用紙が転写加压ローラ72で印刷版胴70の外周面に押圧されると、インキローラ76によって送り出されたインキは用紙の表面に転移し、これによってインキ画像が形成される。インキとしては、一般的に水系成分と油系成分のエマルジョンを形成するエマルジョン型インキが用いられている。これは、印刷版胴70や孔版原紙を通過する過程で固化しないように組成配分がなされており、安定度の高い特性を有している。

【0003】しかしながら、この固化が遅いインキ特性に加えて、用紙に転移したインキの厚みが通常数十ミクロンと厚いため、乾燥時間が長く、これによつていろいろな問題を抱えている。すなわち、用紙に転写された時点で水系成分の揮発によって乾燥工程が始まるわけであるが、油系成分はそのまま用紙上にとどまるため、画像定着性があまり良くなく、にじみ画像や裏抜け現象（インキが用紙の裏側まで浸透すること）が発生し易い。また、用紙を連続的に搬送して高速多量印刷を行う場合には1枚当たりの乾燥時間が非常に短いため、排紙トレイに積層排紙された場合、ある用紙の画像がすぐ上の用紙の裏面に転移する、いわゆる裏移り現象が生じ、印刷物の品質低下を來していた。

【0004】また、図11に示すように、上述の印刷構成が複数並列配置された多色印刷対応の孔版印刷機の場合、印刷部Aで1色目のインキ画像を転写した用紙に印刷部Bで2色目のインキ画像を転写する際に、1色目のインキが用紙を介して2色目の孔版原紙に付着し、その付着インキが再度次の用紙に付着して地汚れや2重画像となる、いわゆるオフセット現象を生じていた。

【0005】このようなインキ画像の低乾燥性に起因する問題に対処する方法としては、熱又は熱風等で用紙に転移したインキ画像を強制的に急速乾燥する等、いろいろ考えられるが、製造コストや画像品質の観点から、例えば特開平5-318898号公報に開示される間接印刷方式（オフセット印刷方式）のものが知られている。

50 これは、印刷版胴で形成されたインキ画像を一旦中間転

写体に転写し、この中間転写体に転写されたインキ画像を押圧手段による加圧力で用紙に転写するものである。中間転写体の表面には耐油性の弾性シートが貼り付けられており、印刷後の弾性シートに残留したインキをクリーニング装置で除去するようになっている。クリーニングはクリーニングローラにクリーニング液を供給する化学洗浄方式となっている。この方式によれば、中間転写体への転写工程自体による乾燥促進作用を得ることができることに加え、中間転写体へ転移したインキ画像を用紙に十分に押し込んで浸透させることができ、インキ画像の盛り上がり（厚み）を少なくして乾燥を速めることができる。

【0006】これと同様な間接印刷方式によるものとして、特開平8-142302号公報に記載の印刷装置がある。この装置の場合、中間転写体から用紙へのインキの転写性をより良くするため、また、転写後に中間転写体に残留するインキを除去し易くするため、中間転写体の少なくとも表面は、撓インキ性を示す材料で平滑に形成されている。また、残留インキを除去するため、中間転写体の表面にインキ除去液を供給するインキ除去液供給手段が備えられている。撓インキ性を示す材料としては、4フッ化エチレン（PTFE）、シリコンゴム等が例示されている。

【0007】

【発明が解決しようとする課題】しかしながら、上記従来の間接印刷方式の場合、いずれも中間転写体の表面（特開平5-318898号公報では弾性シート表面、以下同じ）に残留したインキをクリーニング液を使用して除去する構成であるため、中間転写体表面に微量なクリーニング液の薄膜が形成され、これによってにじみ画像が発生する、という新たな問題が生じている。また、このような画像品質上の問題に加え、クリーニング液の供給、回収手段、タンク等の機構が不可欠となるためにクリーニング装置が複雑・大型化する、という構成上の問題も生じている。

【0008】本発明は、にじみ画像やオフセット現象、裏移り等の印刷物の品質上の問題を解消することができるとともに、クリーニング装置の複雑・大型化を回避できる孔版印刷機の提供を、その主な目的とする。

【0009】

【課題を解決するための手段】特開平5-318898号公報や特開平8-142302号公報に開示された技術では、印刷版胴で形成されたインキ画像を中間転写体によってそのまま受け止め、これをそのままの状態で用紙に転写するという考えに基づいている。これは、特開平8-142302号公報の場合、中間転写体の少なくとも表面を撓インキ性を示す材料で形成し、その材料として4フッ化エチレン（PTFE）を筆頭に挙げている点から明らかである。すなわち、4フッ化エチレン（PTFE）は、撓水・撓油性の両特性を高水準に備えた機

能材料としてよく知られており、この材料で中間転写体の表面を形成した場合、印刷版胴から転写されたインキ画像の水系成分はもちろんのこと、油系成分もそのまま中間転写体の表面に保持されることになる。換言すれば、転写後に中間転写体の表面に残る残留インキも油系成分がそのまま保持されているからクリーニング液を使用するクリーニング装置が必要となるのである。なお、撓インキ性を示す材料として、他にシリコンゴムが例示されているが、これも同様の観点から採用されるものである。また、特開平5-318898号公報の場合には、「耐油性の弾性シート」という記載があることから、特開平8-142302号公報と同様の考えに基づくことは明らかである。

【0010】裏移り等の問題の根本的原因は、既述の通り、用紙に転写されたインキ画像の油系成分が保持され、これによって転写されたインキ画像の乾燥に時間がかかることがある。インキ画像の水系成分は中間転写体から用紙への転写時に揮発又は用紙に吸収されて揮発するから、油系成分を中間転写体で吸収してやれば用紙への転写と同時にインキ画像の速乾性を得ることができるとともに、中間転写体の表面に残留したインキ（未転写インキ）も油系成分が少ないから、インキの顔料を主体とした粉末状態で残り、このためクリーニング液を用いることなく単なる機械的な搔き取り態様で除去できることになる。これが本発明の趣旨である。具体的には、請求項1記載の発明では、インキ画像を形成する印刷版胴と、該印刷版胴に圧接され上記インキ画像を転写される中間転写体と、該中間転写体に用紙を押圧する押圧手段とを備え、上記インキ画像を上記中間転写体に一旦転写した後に上記用紙に転写する孔版印刷機において、上記中間転写体の少なくとも表面が溶剤浸透特性を有する材料で形成されているとともに、上記中間転写体の転写後の表面をクリーニング液を使用せずにクリーニングするクリーニング手段を備えている、という構成を探っている。

【0011】請求項2記載の発明では、請求項1記載の構成において、上記中間転写体の表面に、上記印刷版胴が両面同時印刷可能に2つ圧接され、一方の印刷版胴が上記押圧手段の機能を兼ねる、という構成を探っている。請求項3記載の発明では、請求項2記載の構成において、上記印刷版胴のうち、上記押圧手段の機能を兼ねない方の印刷版胴が上記中間転写体に対して接離自在に設けられている、という構成を探っている。請求項4記載の発明では、請求項1記載の構成において、上記中間転写体の表面周囲に、上記印刷版胴が多色印刷可能に複数個接続されている、という構成を探っている。

【0012】請求項5記載の発明では、インキ画像を形成する印刷版胴が多色印刷の各色に対応して複数個並列配置されているとともに、上記インキ画像を転写される中間転写体がこれらの印刷版胴の全部もしくは2版目以

降の印刷版胴に個別に圧接され、且つ、上記印刷版胴もしくは上記中間転写体に用紙を押圧して該用紙に上記インキ画像を転写するための押圧手段を備え、上記中間転写体の少なくとも表面は溶剤浸透特性を有する材料で形成されており、上記用紙への転写位置下流側に上記中間転写体の表面をクリーニング液を使用せずにクリーニングするクリーニング手段を備えている、という構成を探っている。

【0013】請求項6記載の発明では、請求項1又は2又は3又は5記載の構成において、上記用紙への転写工程前に、上記中間転写体の表面に溶剤浸透特性を有する部材を圧接する、という構成を探っている。請求項7記載の発明では、請求項4記載の構成において、上記各々の印刷版胴の下流側における上記中間転写体の表面に、溶剤浸透特性を有する部材を圧接する、という構成を探っている。請求項8記載の発明では、請求項1又は4又は5記載の構成において、上記押圧手段が熱源を有している、という構成を探っている。請求項9記載の発明では、請求項1又は4又は5記載の構成において、上記中間転写体の内部に蓄積するインキの油系成分を上記押圧手段に一旦転移させた後、上記用紙の裏面に転移させて排出する、という構成を探っている。請求項10記載の発明では、請求項1又は4又は5記載の構成において、上記押圧手段を、上記中間転写体に圧接した位置に保持する、という構成を探っている。

#### 【0014】

【実施例】以下、本発明の一実施例を図1及び図2に基づいて説明する。孔版印刷機には、図1に示すように、印刷版胴2と、この印刷版胴2の外周面に圧接された中間転写体4と、この中間転写体4に用紙6を押圧する押圧手段としての転写加圧ローラ8と、用紙6に対する中間転写体4の転写後の表面をクリーニングするクリーニング装置10が備えられている。転写加圧ローラ8は中間転写体4に圧接され、且つ、その状態を保持するよう設けられている（請求項10）。

【0015】印刷版胴2は、多孔構造のスクリーンドラム12と、このスクリーンドラム12の内部に装備されたインキ供給手段14と、スクリーンドラム12の外周面に巻き付け状態で装着される孔版原紙16とから概略構成されている。インキ供給手段14は、スクリーンドラム12の回転軸としてのインキ供給パイプ18と、スクリーンドラム12の内周面にエマルジョン型インキを供給するインキローラ20と、このインキローラ20との間に形成されるインキ溜まり22からのインキ量を規制するドクターローラ24とから構成されている。孔版原紙16は、図示しない製版・給版部で原稿の画像情報を基づいてサーマルヘッドで溶融穿孔方式で画像を形成された後、ロール状態から所定長さに切断され、スクリーンドラム12の外周面に備えられたクランバ26での先端を挟持されてスクリーンドラム12に装着され

る。印刷完了後の孔版原紙16は、所定の排版工程に基づいて処理されるようになっている。

【0016】インキ供給手段14から供給されたインキはスクリーンドラム12をその径方向に通り抜けて孔版原紙16の穿孔部から中間転写体4の圧接力によって滲み出し、これによって中間転写体4の表面にインキ画像が転写される。中間転写体4に転写されたインキ画像は、転写加圧ローラ8の押圧作用によって用紙6の表面6aに転写される。

【0017】中間転写体4は、図2に示すように、その表面が溶剤浸透特性を有する材料としてのシリコンゴム層28で形成されている（請求項1）。シリコンゴムは撥水性に優れるが、撥油性においては4フッ化エチレン（PTFE）等よりも劣ることが知られている。このシリコンゴムの撥油性における特性低下に着目し、これを溶剤浸透特性として利用するものである。インキ画像の一部分について模式的に説明すると、印刷版胴2から転写された直後のインキ画像30は、図2の第1過程に示すように、水系成分と油系成分がともに表面に存在し、大きな盛り上がり状態となっている。時間が経過すると、第2過程に示すように、シリコンゴム層28の溶剤浸透特性によってインキ画像30のある程度の油系成分30aはシリコンゴム層28内に取り込まれ、表面には少ない油系成分と、撥水性によって水系成分30b等が残る。かかる状態で用紙6への転写がなされるため、インキ画像30は油系成分の少ない状態で用紙6の表面上に転写される。水系成分30bは揮発又は用紙6に吸収されて急激に減少する。そのため、第3過程に示すように、転写後の中間転写体4の表面に残存する未転写のインキは、油系成分と水系成分が共に少ないので顔料を主体とした粉末状態となる。

【0018】この残存インキを除去するためのクリーニング装置10は、クリーニングローラ32と、このクリーニングローラ32に接触する絞りローラ34と、除去したインキを収容するケーシング36とから構成されている。クリーニングローラ32にはブラシローラを使用している。上述のように、残存インキが粉末状態であり、且つ、油系成分が極めて少ないために、機械的除去手段としてのブラシローラで十分であり、クリーニング液による化学的洗浄は必要ない。クリーニングローラ32で掻き取ったインキは絞りローラ34により掻き取られ、ケーシング36内に回収される。

【0019】シリコンゴム層28内に蓄積する油系成分は、中間転写体4と転写加圧ローラ8との間に用紙6が送られる前の圧接によって転写加圧ローラ8に転移し、用紙6への転写時に、転写加圧ローラ8からさらに用紙6の裏面6bに転移する（請求項9）。このため、中間転写体4の表面層部分のみを溶剤浸透特性を有する材料で形成しても、油系成分の蓄積による飽和状態は起こらず、常に溶剤浸透特性を発揮させることができる。ま

た、エマルジョン型インキを使用することによって、シリコンゴム層28の表面でも十分な量のインキを載せることができ、すなわち、適正な画像濃度を得るに十分な量のインキを載せることができ、その油系成分を吸収することによって、上述のようにクリーニングも容易となる。

【0020】このように、中間転写体4の少なくとも表面を溶剤浸透特性を有する材料で形成すると、印刷版胴2から中間転写体4に転写され中間転写体4の表面に残存するインキ画像の油系成分を少なくすることができる。用紙6へ転写されたインキ画像の乾燥速度を大幅に速めることができ、にじみ画像や裏抜け、裏移りを防止することができる。従って、高品質、高速印刷が可能となる。なお、上記実施例では中間転写体4の表面層のみを溶剤浸透特性を有する材料で形成したが、全体をこの材料で形成してもよい。また、溶剤浸透特性を有する材料としてはシリコンゴムに限らず、撥水性をも備えるものであれば適宜に採用できる。また、転写加圧ローラ8を常に中間転写体4へ圧接する構成であるので、転写加圧ローラ8が中間転写体4へ衝突することによる騒音を防止できるとともに、接離機構が不要になるのでコストダウンを図ることができ、さらには、転写加圧ローラ8と中間転写体4の耐久性の向上を図ることができる。もちろん、接離機構によって転写加圧ローラ8を中間転写体4へ接離自在に設けても上記溶剤浸透特性に基づく機能が得られることに変わりはない。

【0021】図3及び図4は、請求項2及び3に対応する実施例を示すものである。本実施例は、「にじみ画像やオフセット現象、裏移り等の印刷物の品質上の問題を解消することができるとともに、クリーニング手段の複雑・大型化を回避できる孔版印刷機の提供」という主目的に加え、両面同時印刷方式の孔版印刷機における片面のみを印刷する場合の孔版原紙の無駄な使用の回避を目的としている。なお、上記実施例と符号が同じものについては、簡略化して示す(以下、同じ)。また、その構成及び機能についての説明は上記実施例と同一であるので特に必要がない限り省略する(以下、同じ)。本実施例における両面同時印刷対応の孔版印刷機は、図3に示すように、中間転写体4と、この中間転写体4の上下においてそれぞれ圧接される上側の印刷版胴40と、下側の印刷版胴42と、クリーニング手段10とから概略構成されている(請求項2)。下側の印刷版胴42におけるインキの供給方向は矢印Nの方向である。便宜上、上側の印刷版胴40のインキカラーを赤色、下側の印刷版胴42のインキカラーを青色とすると、中間転写体4を介した中間印刷は用紙6の裏面6bに転写される青色のインキ画像のみであり、用紙6の表面6aに転写される赤色のインキ画像は従前方式と同様に、印刷版胴40から直接に転写される。従って、この場合、青色のインキ画像の転写においては印刷版胴40が上記実施例における

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る転写加圧ローラ8として機能し、赤色のインキ画像の転写においては中間転写体4が同様の機能を呈することになる。転写後の未転写インキは上記実施例で説明したと同様に、クリーニング手段10で搔き取られ、中間転写体4の表面は常に新しい表面に維持される。

【0022】また、下側の印刷版胴42は図示しない駆動手段によって、中間転写体4に対して接離自在に設けられている(請求項3)。片面印刷を行う場合には、図4に示すように、下側の印刷版胴42が中間転写体4から離される。これによって、中間転写体4を転写加圧ローラとする直接転写方式によって片面印刷を行うことができる。従来において、両面同時印刷対応の孔版印刷機で片面印刷を行う場合には、使用しない印刷版胴のインキによって用紙裏面が汚れないように、わざわざ使用しない印刷版胴の表面に未製版の孔版原紙を装着する必要があったが、本実施例のものによれば、インキ汚れの心配は無くなるので、孔版原紙の無駄な消費を回避することができる。

【0023】図5は、請求項4及び7に対応する実施例を示すものである。本実施例における孔版印刷機は、同時多色印刷機能を有するもので、一つの中間転写体4の表面の周囲に二つの印刷版胴44, 46が圧接されており、それぞれの印刷版胴44, 46の下流側には溶剤吸収手段48, 50が設けられている。印刷版胴44の下流側に位置する溶剤吸収手段48は、溶剤浸透特性を有する部材で形成されたプロッターローラ52と、プロッターローラ52に付着したインキを搔き落すプロッターケーブルローラ54と、搔き落されたインキを収容するケーシング56とから構成されている。同様に、印刷版胴30 46の下流側に位置する溶剤吸収手段50は、プロッターローラ52と、プロッターケーブルローラ54と、ケーシング58とから構成されている。ここで言う溶剤とは、エマルジョン型インキに含まれる油系成分を指し、流動パラフィンである。中間転写体4に転写されたインキ画像は、中間転写体4の表面から外方へ遠い部分はまだ中間転写体4の溶剤浸透特性が十分に行き届かないため、油系成分が多く存在する。転写工程前にこの油系成分を吸収することによって、また、余分なインキを搔き取ると同時に中間転写体4の表面上に形成された山形状のインキを平にすることによって、にじみのない良好な印刷画像を得ることができる。また、油系成分が少なくなることによってインキの粘着力が上がるため、転写効率の向上を図ることができる。かかる観点から溶剤吸収手段48, 50が設けられている。なお、各プロッターローラ52は、中間転写体4と連れ回りするようになっている。また、各プロッターローラ52は、中間転写体4と同様に、シリコンゴムで形成されている。

【0024】便宜上、第1版目の印刷版胴44のインキカラーを赤色、第2版目の印刷版胴46のインキカラーを青色とすると、赤色インキで中間転写体4上に形成さ

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れたインキ画像は溶剤吸収手段48のプロッターローラ52によって余分なインキと油系成分を吸収される。これによって、下流側における青色インキ対応の印刷版胴46の孔版原紙に赤色のインキが再転写されるオフセット現象が防止される。その後、中間転写体4には青色のインキ画像が形成されるが、転写前に溶剤吸収手段50のプロッターローラ52によって余分なインキと油系成分が吸収される。次いで転写加圧ローラ8の押圧作用によって用紙6上に2色のインキ画像が転写される。転写しきれなかった未転写インキはクリーニング手段10によって搔き落され、中間転写体4の表面は新しくなって次の印刷に備えられる。このような構成とすることによって、一つの中間転写体4で同時に2色の印刷物を得ることが可能となる。本実施例においては2色同時印刷対応の例を示したが、印刷版胴の数を増やすことにより、その数に見合った複数の色の印刷物を同時に得ることができる。

【0025】図6及び図7は、請求項5に対応する実施例を示すものである。本実施例における孔版印刷機は、最初の実施例で示した中間転写体4を有する印刷構成部を用紙6の搬送方向に2個並列配置して構成されている。この例によれば、第1版目の赤色インキは転写体4の溶剤吸収特性によって油系成分を吸収されるので、第2版目までの過程で十分に乾燥し、また、第2版目の青色インキを同様に転写体4の溶剤吸収特性によって油系成分を吸収されるので図11の従来構成で生じていたオフセット現象や裏移り現象を防止することができる。図7は、第2版目の印刷構成部にのみ中間転写体4を設けた例である。この例の場合には、第1版目は従来方式の直接転写構成であるが、第1版目の赤色インキが載った用紙6に第2版目の青色インキを載せる際に、中間転写体4に移った赤色インキはそこで油系成分を吸収されるとともにクリーニング手段10で搔き取られる。従って、用紙6上にはオフセット画像は発生せず、また、用紙6上の余分な赤色インキが結果的に中間転写体4によって搔き取られることになるので、にじみ画像の発生も抑制される。

【0026】図8は、請求項6、8に対応する実施例を示すものである。図6で示した並列配置構成による多色印刷対応の例であるが、図5で示した例と同様の観点から、用紙への転写工程前に中間転写体4に転写されたインキ画像の油系成分を吸収可能に溶剤吸収手段58が設けられている(請求項6)。溶剤吸収手段58は、プロッターローラ52と、このプロッターローラ52に付着したインキを搔き取るブラシローラ60と、プロッターケーシング62とから構成されている。また、本実施例における転写加圧ローラ64は熱源を有しており(請求項8)、100℃に加熱できるようになっている。これによって中間転写体4上のインキは加熱されるので、用紙6への転写率が向上し、クリーニング手段10の負担が軽減されるとともに、より高濃度の印刷画像を得ることができる。この転写加圧ローラ64の温度は、インキ組成に応じて予め実験等によって得られた最適値が設定されることになる。

【0027】上記各実施例では、ブラシローラ32を有するクリーニング手段10を用いたが、図9に示すように、纖維シート68を繰り出しローラ69、加圧ローラ70、巻き取りローラ71によって矢印方向に移動させるクリーニング手段66を用いてもよい。なお、上記各実施例では、説明上、インキの組成成分で油系成分と称したのは主成分である流動パラフィンを指しているが、これに限定されるものではなく、他の溶剤、例えば炭化水素系一般等についても同様の溶剤浸透特性による上記効果を得ることができるものである。

#### 【0028】

【発明の効果】請求項1記載の発明によれば、中間転写体の少なくとも表面を溶剤浸透特性を有する材料で形成する構成としたので、印刷版胴から中間転写体に転写され中間転写体の表面に残存するインキ画像の油系成分を少なくすることができるので、用紙へ転写されたインキ画像の乾燥速度を大幅に速めることができ、にじみ画像や裏抜け、裏移り、オフセット現象を防止することができる。従って、高品質、高速印刷が可能となる。また、クリーニング液を使用しないクリーニング手段を用いる構成であるので、クリーニング液の供給、回収手段、タンク等の機構を必要とせず、よってクリーニング手段の複雑化、大型化を回避することができる。また、クリーニング液を使用しないために残存したクリーニング液の薄膜によるにじみ画像を回避することができる。

【0029】請求項2記載の発明によれば、上記中間転写体の表面に両面同時印刷可能に2つの印刷版胴を圧接する構成としたので、上記基本効果に加え、裏移り現象の発生のない高品質の同時両面印刷画像を得ることができ、また、にじみの少ない高品質の同時両面印刷画像を得ることができる。請求項3記載の発明によれば、両面同時印刷構成において一方の印刷版胴を中間転写体に対して接離自在な構成としたので、上記基本効果に加え、片面印刷の場合における孔版原紙の無駄な消費を回避することができる。請求項4記載の発明によれば、一つの中間転写体の回りに複数の印刷版胴を配置した多色印刷構成としたので、上記基本効果に加え、多色印刷構成のコンパクト化を図ることができる。請求項5記載の発明によれば、印刷版胴を複数個並列配置し、少なくとも2版目以降の印刷版胴に上記中間転写体を圧接する構成としたので、上記基本効果に加え、オフセット画像、裏移り現象の発生のない高品質の多色印刷画像を得ることができる。

【0030】請求項6、7記載の発明によれば、用紙への転写前に溶剤を吸収する構成としたので、転写率の向上を図ることができるとともに、クリーニングに対する

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負荷の減少によってクリーニング部材の長寿命化を図ることができる。また、基本効果におけるにじみ画像の防止精度をさらに向上させることができる。請求項8記載の発明によれば、押圧手段が熱源を有する構成としたので、上記基本効果に加え、転写率の向上を図ることができるとともに、クリーニングに対する負荷の減少によってクリーニング部材の長寿命化を図ることができる。請求項9記載の構成によれば、中間転写体に蓄積する油系成分を押圧手段を経由して排出する構成としたので、上記基本効果に加え、中間転写体の溶剤浸透特性による溶剤吸収機能を常に同レベルで発揮させることができる。請求項10記載の構成によれば、押圧手段を中間転写体に圧接した状態に保持する構成としたので、押圧手段が中間転写体に衝突することによる騒音を防止することができるとともに、接離機構が不要になるのでコストダウンを図ることができ、さらには衝突しない構成によって押圧手段と中間転写体の耐久性を向上させることができる。

## 【図面の簡単な説明】

【図1】本発明の一実施例を示す孔版印刷機の概要図である。

【図2】中間転写体の溶剤浸透特性を示す模式図である。

【図3】両面同時印刷対応の例を示す概要図である。

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【図4】両面同時印刷対応の例における片面印刷の場合の構成を示す図である。

【図5】中間転写体を一つ用いた多色印刷対応の例を示す概要図である。

【図6】印刷版胴を並列配置した多色印刷対応の例を示す概要図である。

【図7】印刷版胴を並列配置した多色印刷対応の例において、一方のみに中間転写体を備える場合の概要図である。

【図8】印刷版胴を並列配置した多色印刷対応の例において、押圧手段が熱源を有する場合の概要図である。

【図9】クリーニング手段の変形例を示す概要図である。

【図10】従来例を示す概要図である。

【図11】印刷版胴を並列配置した多色印刷対応の従来例を示す概要図である。

## 【符号の説明】

2、40、42、44、46 印刷版胴

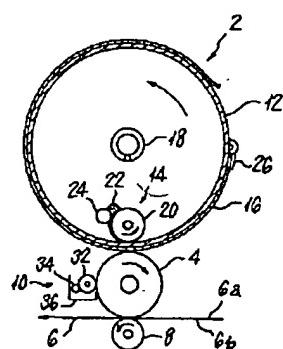
4 中間転写体

6 用紙

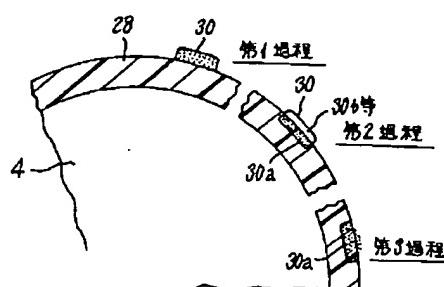
10 クリーニング手段

28 溶剤浸透特性を有する材料としてのシリコンゴム層

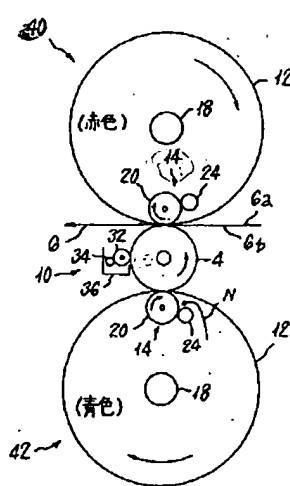
【図1】



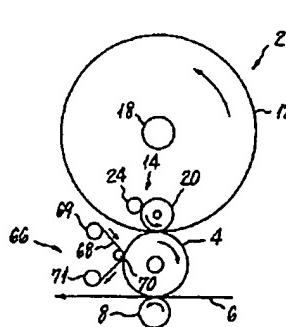
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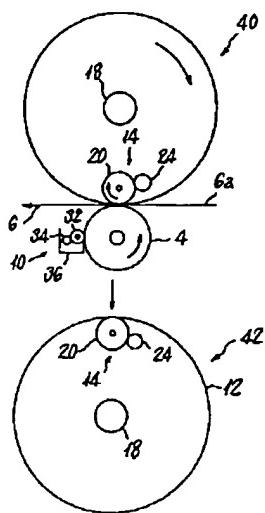
【図3】



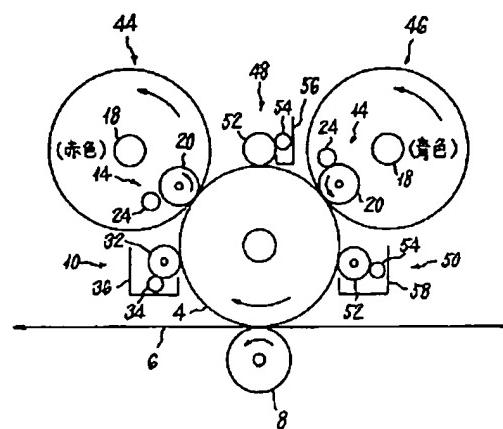
【図9】



【図4】

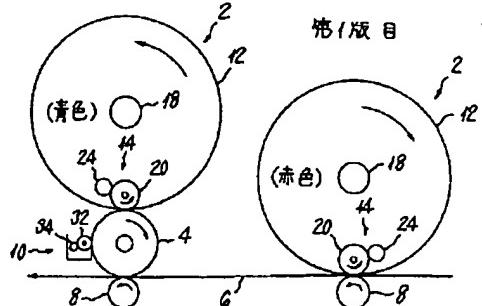


【図5】

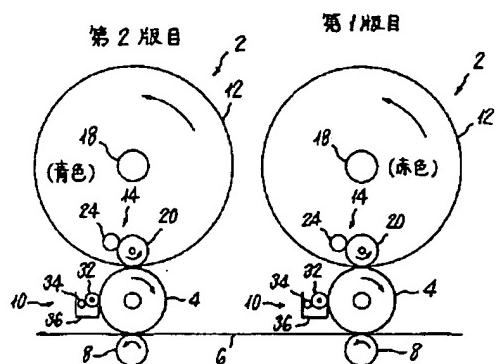


【図7】

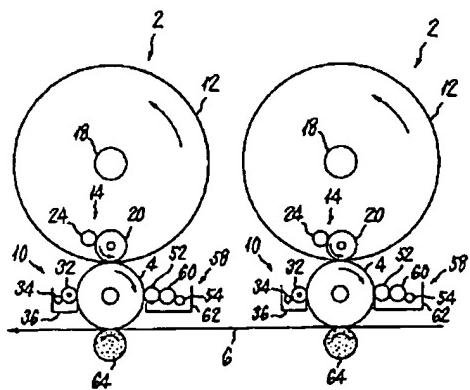
第2版目



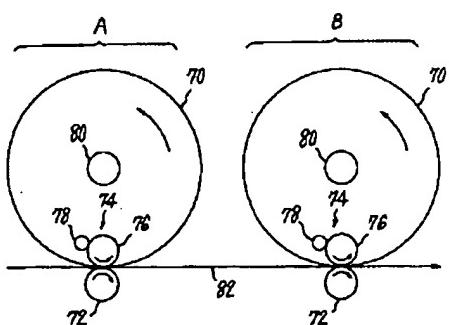
第1版目



【図8】



【図11】



CLIPPEDIMAGE= JP410166705A  
PAT-NO: JP410166705A  
DOCUMENT-IDENTIFIER: JP 10166705 A  
TITLE: STENCIL PRINTER

PUBN-DATE: June 23, 1998

INVENTOR-INFORMATION:

NAME  
ITO, AKIHIRO

ASSIGNEE-INFORMATION:

NAME	COUNTRY
TOHOKU RICOH CO LTD	N/A

APPL-NO: JP08330972

APPL-DATE: December 11, 1996

INT-CL\_(IPC): B41L013/04; B41M001/14

ABSTRACT:

PROBLEM TO BE SOLVED: To prevent bleeding and setoff by forming at least the surface of an intermediate transfer body of a material having a solvent permeating property, and providing a cleaning means to clean the surface of the intermediate transfer body after transfer without using a cleaning liquid.

SOLUTION: The stencil printer is provided with a cylinder 2, an intermediate transfer body 4 pressed against the cylinder 2, a transfer-compression roller 8 as a pressing means that presses paper 6 against the transfer body 4, and a cleaning device 10 that cleans the surface of the transfer body 4 after transfer. The intermediate transfer body 4 is formed of a silicone rubber layer as a material having a solvent permeating property in the surface and makes possible to transfer an ink image to the paper 6 in a state of having less oily components. The cleaning device 10 is composed

of a cleaning roller  
32, a squeezing roller 34 that contacts the roller, and a  
casing 36 that stores  
removed ink, and ink is removed with a brush roller as a  
cleaning roller 32.

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